

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A method of extracting a specified image subject which successively implements a plurality of specified image subject extracting algorithms, comprising the steps of:

implementing an extracting algorithm of a precedent stage under a predetermined extracting condition to obtain an extraction result;

changing an extracting condition of a subsequent stage so as to be adapted to the thus obtained extraction result; and

implementing an extracting algorithm of said subsequent stage under the thus changed extracting condition,

wherein said precedent stage comprises extracting a shape of regular geometric form of the specified image subject.

2. (currently amended): A method of extracting a specified image subject which implements a plurality of specified image subject extracting algorithms in each stage of a plurality of stages by means of parallel processing, comprising the steps of:

managing respective extracting states of said plurality of specified image subject extracting algorithms in said each stage;

qualifying respective extraction processing conditions of said plurality of specified image subject extracting algorithms in a subsequent stage according to the respective extracting states in a precedent stage; and

implementing said plurality of specified image subject extracting algorithms of said subsequent stage under the thus qualified respective extraction processing conditions by means of parallel processing,

wherein said precedent stage comprises extracting a shape of regular geometric form of the specified image subject.

3. (original): The method of extracting the specified image subject according to claim 2, wherein said respective extraction processing conditions are areas to be subjected to extraction processing when implementing said plurality of specified image subject extracting algorithms of said subsequent stage.

4. (original): The method of extracting the specified image subject according to claim 2, wherein said respective extraction processing conditions are types of extracting algorithms to be implemented at said subsequent stage.

5. (original): The method of extracting the specified image subject according to claim 2, wherein said respective extraction processing conditions are control parameters inside extracting algorithms to be implemented in said subsequent stage.

6. (original): The method of extracting the specified image subject according to claim 2, wherein said plurality of specified image subject extracting algorithms to be implemented by means of parallel processing in said each stage are of same combination in said plurality of stages.

7. (original): The method of extracting the specified image subject according to claim 2, wherein said plurality of specified image subject extracting algorithms to be implemented by means of parallel processing in said each stage are of different combination in said plurality of stages.

8. (currently amended): A device for extracting a specified image subject, comprising:

a plurality of stages of image subject extraction processing units for successively performing a plurality of specified image subject extracting algorithms, respectively; and

an extracting condition change control unit for adaptively changing an extracting condition in an image subject extraction processing unit of a subsequent stage in accordance with an image subject extraction result by the image subject extraction processing unit of a precedent stage,

wherein said precedent stage comprises extracting a shape of regular geometric form of the specified image subject.

9. (currently amended): A device for extracting a specified image subject, comprising:

a plurality of stages of image subject extraction parallel processing units, each image subject extraction parallel processing unit for implementing a plurality of specified image subject extracting algorithms in each stage of said plurality of stages by means of parallel processing; and

a control unit for managing respective image subject extraction states of said plurality of specified image subject extracting algorithms in each stage by said each image subject extraction

parallel processing unit of said image subject extraction parallel processing units and qualifying respective extraction processing conditions of said plurality of specified image subject extracting algorithms in a subsequent stage of an image subject extraction parallel processing unit according to the respective image subject extraction states by the precedent stage of the image extraction parallel processing unit,

wherein said precedent stage comprises extracting a shape of regular geometric form of the specified image subject.

10. (original): The device for extracting the specified image subject according to claim 9, wherein said control unit qualifies areas to be subjected to extraction processing in said subsequent stage of said image subject extraction parallel processing unit as said respective extraction processing conditions.

11. (original): The device for extracting the specified image subject according to claim 9, wherein said control unit qualifies types of extracting algorithms to be implemented in said subsequent stage of said image subject extraction parallel processing unit as said respective extraction processing conditions.

12. (original): The device for extracting the specified image subject according to claim 9, wherein said control unit qualifies control parameters inside extracting algorithms to be implemented by said subsequent stage of said image subject extraction parallel processing unit as said respective extraction processing conditions.

13. (original): The device for extracting the specified image subject according to claim 9, wherein said image subject extraction parallel processing unit implements said plurality

of specified image subject extracting algorithms with same combination in each stage of said plurality of stages by means of parallel processing.

14. (original): The device for extracting the specified image subject according to claim 9, wherein said image subject extraction parallel processing unit implements said plurality of specified image subject extracting algorithms with different combination in each stage of said plurality of stages by means of parallel processing.

15. (currently amended): A method of extracting a specified image subject, comprising the steps of:

performing image subject extraction processing by a specified image subject extracting algorithm or algorithms for each extraction area;

performing a vote in an N-dimensional space of an image characteristic quantity for each extraction area extracted by said specified image subject extracting algorithm or algorithms; and

performing weighting of degree of certainty as a specified image subject based on an aggregation value of the vote within a section area for aggregation in said N-dimensional space,
wherein a first extraction area is extracted according to a shape of regular geometric form of the specified image subject.

16. (original): The method of extracting the specified image subject according to claim 15, wherein said image subject extraction processing by said specified image subject extracting algorithm or algorithms is performed through dividing it into a plurality of stages; and said image subject extraction processing in a subsequent stage is preferentially applied to an extraction area in which said aggregation value in the voting space of said image characteristic quantity exceeds a predetermined value.

17. (original): The method of extracting the specified image subject according to claim 15, wherein said specified image subject extraction processing by said specified image subject extracting algorithm or algorithms is performed through dividing it into a plurality of stages; and said image subject extraction processing in a subsequent stage is preferentially applied to an extraction area corresponding to said section area for aggregation within a preferential frame in the voting space of said image characteristic quantity.

18. (original): The method of extracting the specified image subject according to claim 15, wherein a combination of a plurality of image characteristic quantities selected from the group consisting of a position, size, direction or orientation of an extraction area and, a posture, density or color tint of an image subject is used as the N-dimensional space of said image characteristic quantity.

19. (original): The method of extracting the specified image subject according to claim 15, wherein weighting value lowering processing is applied to a region within a predetermined area on a specific characteristic axis with respect to a neighborhood of the region, in which said aggregation value became large, in said N-dimensional characteristic stage.

20. (original): The method of extracting the specified image subject according to claim 19, wherein application of said weighting value lowering processing is processing to remove a remarkably large size or a remarkably small size from extraction data.

21. (currently amended): A device for extracting a specified image subject, comprising:

an image subject extraction processing unit for implementing a specified image subject extracting algorithm or algorithms; and

a weighting processing unit for performing a vote in an N-dimensional space of image characteristic quantity for each extraction area extracted by said image subject extraction processing unit and performing weighting of degree of certainty as the specified image subject based on an aggregation value of the vote within a section area for aggregation in said N-dimensional space,

wherein a first extraction area is extracted according to a shape of regular geometric form of the specified image subject.

22. (original): The device for extracting the specified image subject according to claim 21, wherein said image subject extraction processing unit performs the image subject extraction processing in a plurality of divided stages and applies the image subject extraction processing in a subsequent stage preferentially to an extraction area in which said aggregation value in the voting space of said image characteristic value exceeds a predetermined value.

23. (original): The device for extracting the specified image subject according to claim 21, wherein said image subject extraction processing unit performs the image subject extraction processing through dividing it into a plurality of stages, and applies the image subject extraction processing in a subsequent stage preferentially to an extraction area corresponding to said section area for aggregation within a preferential frame in the voting space of said image characteristic quantity.

24. (original): The device for extracting the specified image according to claim 21, wherein a combination of a plurality of image characteristic quantities selected from the group consisting of a position, size, direction or orientation of an extraction area, and a posture, density

or color tint of an image subject is used as the N-dimensional space of said image characteristic quantity.

25. (original): The device for extracting the specified image according to claim 21, wherein said weighting processing unit applies weighting value lowering processing to a region within a predetermined area on a specific characteristic axis with respect to a neighborhood of the region, in which said aggregation value became large, in said N-dimensional characteristic stage.

26. (original): The device for extracting the specified image subject according to claim 25, wherein application of said weighting value lowering processing is processing to remove a remarkably large size or a remarkably small size from extraction data.

27. (previously presented): The device for extracting a specified image subject according to claim 8, wherein said precedent stage comprises extracting a shape of the specified image subject, and

wherein said subsequent stage comprises detecting a color or hue of the specified image subject.

28. (previously presented): The method of extracting a specified image subject according to claim 1, wherein said predetermined extracting condition comprises electronic flash or backlight information.

29. (previously presented): The device for extracting a specified image subject according to claim 8, wherein said predetermined extracting condition comprises electronic flash or backlight information.

30. (previously presented): The method of extracting a specified image subject according to claim 2, wherein said extraction processing conditions comprise electronic flash or backlight information.

31. (previously presented): The device for extracting a specified image subject according to claim 9, wherein said extraction processing conditions comprise electronic flash or backlight information.

32. (previously presented): The device for extracting a specified image subject according to claim 9, wherein the plurality of specified image subject extracting algorithms in each stage of the plurality of stages are implemented at a same time.

33. (previously presented): The method of extracting a specified image subject according to claim 2, wherein the plurality of specified image subject extracting algorithms in each stage of the plurality of stages are implemented at a same time.

34. (previously presented): The device for extracting a specified image subject according to claim 9, wherein said image subject extraction parallel processing units comprises:
skin color extraction, face contour extraction, hair-on-head extraction,
eye/nose/mouth/eyebrow extraction, body extraction, and non-background area extraction.

35. (previously presented): The method of extracting a specified image subject according to claim 2, wherein said image subject extraction parallel processing units comprises:
skin color extraction, face contour extraction, hair-on-head extraction,
eye/nose/mouth/eyebrow extraction, body extraction, and non-background area extraction.

36. (previously presented): The device for extracting a specified image subject according to claim 9, wherein said algorithms comprise different degrees of resolution.

37. (previously presented): The method of extracting a specified image subject according to claim 2, wherein said algorithms comprise different degrees of resolution.

38. (previously presented): The method of extracting a specified image subject according to claim 15, wherein said vote comprises an aggregation of points indicative of the specified image subject.

39. (previously presented): The device of extracting a specified image subject according to claim 21, wherein said vote comprises an aggregation of points indicative of the specified image subject.

40. (previously presented): A method of extracting a specified image subject according to claim 1, wherein said subsequent stage comprises detecting a color or hue of the specified image subject.

41. (new): A method of extracting a specified image subject according to claim 1, wherein said regular geometric form is circular or elliptical.

42. (new): A method of extracting a specified image subject according to claim 2, wherein said regular geometric form is circular or elliptical.

43. (new): A device for extracting a specified image subject according to claim 8, wherein said regular geometric form is circular or elliptical.

44. (new): A device for extracting a specified image subject according to claim 9, wherein said regular geometric form is circular or elliptical.

45. (new): A method of extracting a specified image subject according to claim 15, wherein said regular geometric form is circular or elliptical.

AMENDMENT UNDER 37 C.F.R. § 1.114(c)
U.S. APPLN. NO.: 09/630,315

ATTORNEY DOCKET NO. Q58744

46. (new): A device for extracting a specified image subject according to claim 21,
wherein said regular geometric form is circular or elliptical.